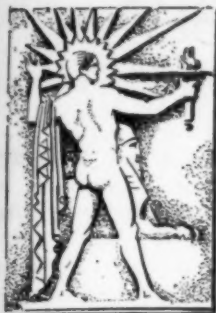


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SCIENCE NEWS-LETTER

The Weekly Summary of Current Science
A SCIENCE SERVICE PUBLICATION

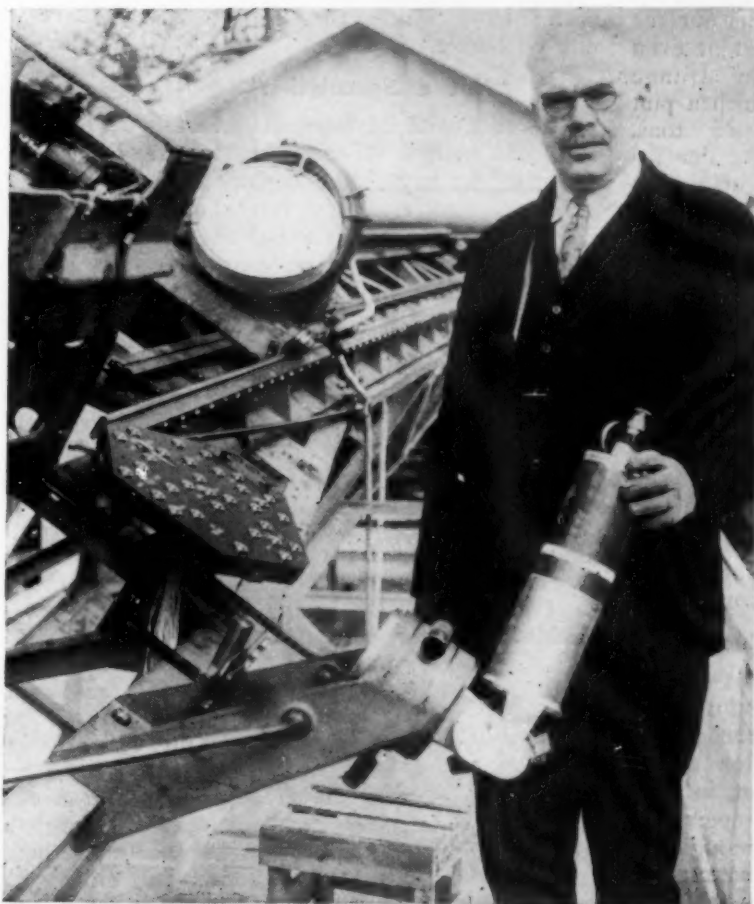


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September 27, 1930



LOOKING FOR BIGGER STARS

Francis Pease and The New Fifty-Foot Interferometer

(See page 206)

Vol. XVIII

No. 494

Stars Are Said to Resemble Eggs

Astronomy

British Astronomer Advances New Theory

THE structure of a star is something like that of an egg—a dense yolk in the center, surrounded by lighter material. This is the new theory proposed by E. A. Milne, Rouse Ball professor of mathematics at Oxford University, in a communication to the magazine *Nature*.

In the "yolk" the temperatures are far higher than astronomers have previously calculated for the interior of a star, he says. His tentative estimate is 100,000,000,000 degrees, instead of a mere 10,000,000 degrees, a figure generally accepted at present. Furthermore this nucleus is extremely dense, as great or even greater than a star like the strange companion of Sirius, of which a pint of its material weighs 25 tons. Prof. Milne thinks that the density of the yolk may reach the maximum possible for ionized matter, that is, matter in which all the atoms are broken up into separate electrons.

Four or five hats take up quite a bit of room in a trunk, but if the hats are chopped up into small bits, the same amount of matter can be put in a much smaller space. Similarly, atoms of matter, consisting of electrons and protons, take up a certain amount of space, but if they are ionized or broken up into their constituents, the same amount of matter can be condensed far beyond anything familiar to us on earth.

Hot, Concentrated Nucleus

The consequences of his theory, says Prof. Milne, "amount to a complete revolution in our picture of the internal constitution of the stars. In the intensely hot, intensely dense nucleus, the temperatures and densities are high enough for the transformation of matter into radiation to take place with ease. It is to this nucleus that we must look for the origin of stellar energy,

a nucleus the existence of which has previously been unsuspected."

Prof. Milne differs from the views of Sir Arthur Eddington, another famous British astronomer, as to the internal structure of a star. According to Sir Arthur, the density of a star increases towards the center, but the increase is a gradual one. Both, however, share the generally accepted view that the light and heat radiated from a star comes from an actual transmutation of the star's matter into energy, but if constructed according to Sir Arthur's ideas, states Prof. Milne, the star would not be stable.

"Not a Speculation"

"Let the rate of internal generation of energy diminish ever so slightly," he says, "the density distribution suffers a remarkable change. The mass suffers an intense concentration toward its centre, the external radius not necessarily being changed. The star tends to precipitate itself at its centre, to cry-

stallize out so to speak, forming a core or nucleus of very dense material. The star tends to generate a kind of 'white dwarf' at its centre, surrounded of course by a gaseous distribution of more familiar type; the star is like a yolk in an egg."

In concluding his communication, he emphasizes the soundness of his views.

"The new results are not a speculation," he declares. "They are derived by taking the observed mass and luminosity of a star, and finding the restrictions these impose on the possible density distribution compatible with this mass and luminosity."

Science News-Letter, September 27, 1930

Roman Child Artists

ONE family of ancient Rome would no doubt be greatly entertained if it could see archaeologists of 1930 poring over the scrawled drawings made on the walls of their house. The drawings, recently discovered, are such as children of ancient Rome, or any other time and place, enjoy scribbling on a handy piece of clean wall space.

The house stood in the famous Appian Way about the time when the Roman Republic became the Empire of Rome. Its ruins have lain buried beneath almost 40 feet of earth.

Prof. Francesco Fornari, Roman archaeologist who has been studying the mural sketches, sees in some of them pictures of fighting gladiators armed with shields, spears, and swords. Another sketch is believed to show an individual being burned. Rows of long and short lines, rising before this person, indicate flames, and there are soldier-like figures on either side who appear to be stirring up the flames with their spears.

Archaeology

Science News-Letter, September 27, 1930

The Answer Is In This Issue

What are some important applications of *high pressures* in industry? p. 195—Can the little *arsenic and lead* that people eat with their food and water cause *baldness*? p. 195—What is an easy way for you to judge how "*perfect*" your figure is? p. 196—How many people are there in the United States and Canada who are both *deaf and blind*? p. 199—Is it possible to increase the *milk* production of cows by a *glandular* treatment? p. 200—For what kind of *poisoning* is the injection of a *sugar* solution an antidote? p. 200—What did physicians *think* of the *Stethoscope* at the time of its introduction? p. 202.



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Beryllium, a Probable Aircraft Metal

Chemistry

New Method of Manufacture Among Reports to Chemists

TO TUNGSTEN, aluminum and the other metals formerly laboratory curiosities that have now come into wide commercial use may soon be added beryllium. Before long we may be riding in airplanes made of alloys with this metal as a main constituent, or wearing jewelry made of it alloyed with copper. At the meeting of the American Chemical Society in Cincinnati, Dr. Harold S. Booth, professor of chemistry at Western Reserve University, told how he and Miss Gilberta G. Torrey had discovered a new method for making this metal in the pure metallic form.

Beryllium, which is a chemical element like iron or copper, is the lightest metal that does not corrode when exposed to the air. Dr. Booth declared that he had a piece which remained bright after being exposed to the fumes of his laboratory for years.

Strong, Light, Non-Tarnishable

"Alloys of beryllium with aluminum have the strength of steel and the lightness of aluminum," he said. "They should be of value in aircraft and other places where light weight and strength are more important than low cost. Alloyed with copper, beryllium produces a beautiful bronze which can scarcely be told in appearance from gold. It is said to produce a non-tarnishable silver when alloyed with silver. There is immediate need for a thorough study of all the beryllium alloys."

Previously, he said, the metal had only been obtained in the form of impure flakes which could be melted into ingots only with great difficulty. Dr. Booth obtains the metal from the mineral beryl, which is chemically called beryllium aluminum silicate and contains about seven per cent. of beryllium. From this he obtains beryllium oxide, and this is soluble in liquid ammonia. From the ammonia solution of this, or from other water free salts of the metal, it can be deposited by means similar to those used in electroplating.

Dr. Booth stated that his discovery had come as the result of fifteen years of study and said that beryllium is the last important metal to

be conquered in a commercial way, and so has been a real challenge to chemists.

High Pressure in Industry

At another session of the Society there was held a symposium on "Industrial High Pressure Reactions," where the chemists heard how chemical reactions under pressures of as much as seven tons to the square inch are the latest tools to be placed at their disposal. Such pressures are regularly employed in the manufacture of synthetic ammonia from air, and have made the United States declare its independence of the nitrate deposits of South America for raw materials for fertilizers.

More moderate pressures, only two or three tons to the square inch, have caused a revolutionary improvement in the preparation of petroleum and its derivatives. By enabling the raw materials to be used to the full limit of their value, the effect has been equivalent to an increase of nearly a third in the world's supply of petroleum.

The value of high pressure comes from the fact that it forces together the substances involved. Gases, for example, may become as dense as liquids and even the molecules and atoms themselves are compressed. Electrical resistance of some materials is altered, and even new forms of matter, about which little is yet known, have been developed. Under the magic touch of high pressure, with high temperatures to help, substances which will not ordinarily react with each other can be made to behave. The use of these methods has required the development of special alloys and metals to stand the strain, such as chromium nickel steels.

Pressure Produces Methanol

Dr. B. F. Dodge, of Yale University, told of the researches that he and his colleague, Dr. E. F. von Wettberg, have made on what is termed the "methanol equilibrium." He explained that methanol, commonly known as methyl, or wood alcohol, is made from carbon monoxide gas and hydrogen. The former gas which is the coal gas that

sometimes causes death when it comes from defective stoves, consists of oxygen and carbon, while methanol consists of these two elements, and hydrogen as well. But even when mixed the gases do not combine at ordinary temperatures.

With the use of a catalyst, a chemical substance that hastens a chemical change without itself being altered, the two gases may be combined to form wood alcohol. But all known catalysts require temperatures of several hundred degrees to make them work, and at this temperature, as fast as the methanol is formed, it is decomposed back into its original constituents. Under a pressure of some three thousand pounds to the square inch, however, the decomposition of the methanol is greatly reduced, and the method becomes commercially practicable.

Methanol is important in its own right in many industries, and it is also of value as an intermediate product from which can be obtained the whole family of alcohols.

It is in the hydrogenation of petroleum to make gasoline that some of the most important applications of high pressures are found. Dr. R. T. Haslam reported on researches made by him and Dr. R. P. Russell for the Standard Oil Co. By the addition of hydrogen to fuel oil, such as petroleum, it can be converted to gasoline and other of the so-called higher hydrocarbons.

Lead and Arsenic Cause Baldness

The society heard that there is some hope for people afflicted with the variety of baldness known as alopecia areata. Speaking before the Division of Medicinal Chemistry, Dr. C. N. Myers, of the New York Skin and Cancer Hospital, told of the work he has performed in collaboration with Drs. Binford Throne and Herman Feit.

Dr. Myers defined the disorder as "characterized by sharply circumscribed areas of total baldness and disappearance of the hairs from these areas. The falling out of the hair sometimes is gradual, lasting over several days, but sometimes the spots appear within apparently a very few hours. Occasionally marked shock has been (Turn to page 206)

Why Ready-Made Clothes Are Poor Fits — and

BY EMILY C. DAVIS

WHEN the Greek sculptor Cleomenes carved his beloved Venus de Medici, he gave her a waist of 27½ inches and a perfect 34½ bust. She was just past five feet tall, and her proportions were so lovely that they became an ageless standard for feminine perfection.

There was the Apollo Belvedere, too. His marble proportions—six feet two inches in height and with a chest measure of 42 inches—set a mark for growing youth to aim at.

More than twenty-two centuries have passed since Greek artists raised such standards of normally healthy and attractive human beings, and men and women in America are still trying to live up to the reputations of Venuses and Apollos. Perhaps you don't think this applies to you. But if you are among the millions who buy ready-to-wear clothing, you are wearing garments influenced by the proportions of such ideal figures. Or, if you are a woman who makes clothes at home, cutting them out by paper pattern guides, you are still in the same boat. The ideal woman helped shape the pattern to her own elusive lines.

Are You "Statuesque"?

When your garments have to be shortened in the sleeve or let out at the hip, that goes to show that you are among the large percentage of Americans who do not meet the specifications of the ideal. In that case, you are a thirty-eight, or whatever your chest measure may be, but you are not the "statuesque" thirty-eight that the pattern expected of you. You are a tall thirty-eight, or maybe a person with shoulders of more ample spread than can be squeezed into the suit that your chest measure indicates.

The fact is, never in the history of the clothing industry has anyone designed clothes to meet the living specifications of Iowa farmers' wives, Washington government clerks, Chicago business men, or Alabama school children.

This ungathered information about real Americans is the chief cause of our fitting troubles, is the conclusion of Miss Ruth O'Brien, specialist in textiles and clothing at the



Our 2,200 Year Old Models

U. S. Bureau of Home Economics. Miss O'Brien has just surveyed the situation in order to report on the many books and articles that have discussed the problem of making clothes fit human beings.

"To find out what troubles women have in making clothes at home, the Bureau of Home Economics once asked 1,300 women who did home sewing to tell about their difficulties," she explained. "We found that 31 per cent. have trouble in fitting clothes. This was the most frequently mentioned difficulty, and the survey was made before the fashion pendulum swung to closely fitted dresses for women.

"No one can say to what extent this dissatisfaction with patterns has led to greater buying of ready-made clothes, but Americans are certainly buying more factory garments, and this has brought the sizing situation into prominence. The home sewer's struggles to fit a paper pattern to a none-too-regular human form generally lead only to conversational complaints. But similar lack of fit

among buyers of ready-made clothes reaches a wider audience.

"Women are complaining because of the time and money they must spend in having clothes refitted at the stores, and retailers are disturbed at the expense involved in the maintenance of large alteration departments, and the loss of good-will and money in returned goods and controversies over unsatisfactorily fitted garments.

Acute Because Clinging

"The clinging, feminine trend in women's styles is bringing the problem into an acute stage, for accurate fit becomes vital. When risk of refitting is great, a customer displays what is technically known as sales-resistance. She refuses to buy, and departs or takes more of the clerk's time to try on more models."

The industry which produces our clothes is still in the experimental stage, Miss O'Brien points out. The world's first fur coat or grass skirt was an invention of many thousand years ago, but up to the past cen-

How Scientists Can Get You Just the Right Size

Home Economics

tury, clothes were either simple draperies or else were made to measure. Tailors and dressmakers worked by intricate diagrams when they tried to cut an unfamiliar style.

It is scarcely a hundred years since the first ready-to-wear men's suits appeared on the market. Those first suits made for unknown wearers were rather disdainfully regarded. Women's clothes were still being produced by seamstresses. The first paper patterns were devised and sold about sixty-seven years ago. These, too, were for men—a set of graded sizes for men's shirts.

Men Got Early Start

Miss O'Brien considers that the earlier start which the men's clothing industry obtained has given men's clothing an advantage in the matter of fit. By trial and error, more of the conspicuous defects in men's suits and other garments have been remedied.

Strangely enough, American wars have contributed to progress in men's clothing. The routine army measurements made to record the chest and height dimensions of Civil War soldiers were drawn upon by the early manufacturers who were

trying to establish the wholesale clothing business.

But it was the World War which led to the taking of the only scientific measurements ever made on Americans for the purpose of clothing design. Three army officers, who were also scientists, directed the task, and filled a thick army report with the results. Most of this measuring was done when the soldiers demobilized—as you might comment, recalling the variety of emergency ration uniforms worn by many men in war days.

The reason for measuring the discharged men was to file away the figures as a precaution, so that if America again drafts an army, the War Department can order uniforms shipped to various army centers in the sizes that should fit men of that section. Since the measurements were taken with uniforms in mind, they are not exactly what the manufacturer of civilian clothing would prefer. The figures would, nevertheless, be of great value to the men's clothing industry, Miss O'Brien points out, but they lie buried in a government report and apparently have not been discovered.

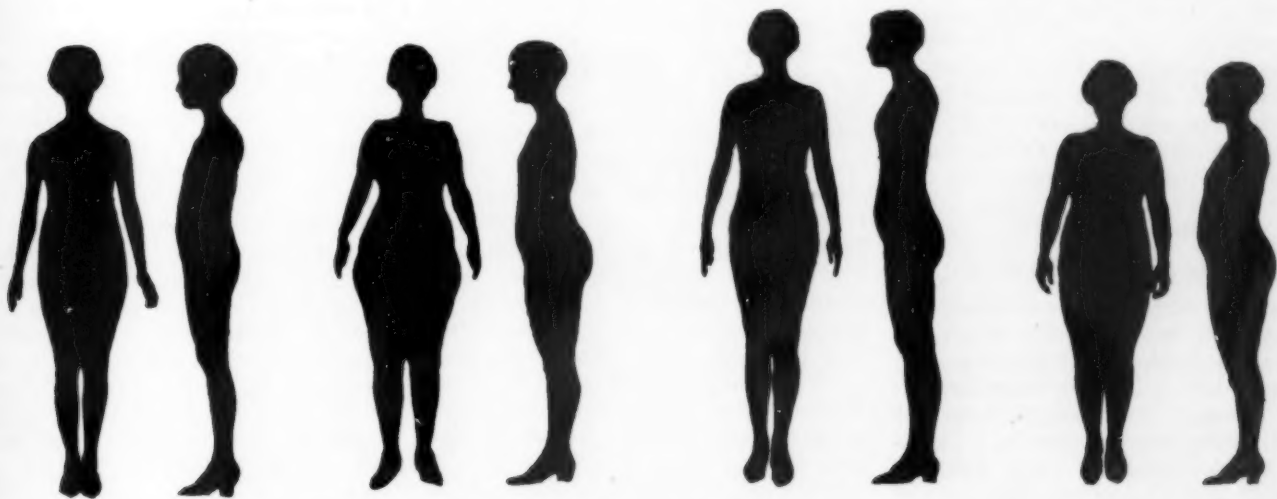
These figures show that there is a real difference between Americans

of different parts of the country, and therefore a difference in their clothing requirements. And American types change, even in a generation or two. During the Civil War, the tallest soldiers were from Kentucky. During the World War, the Missourians proved the tallest. Californians also stood out as exceptionally tall Americans. American cities are centers of low stature, the war figures indicate. In two cities only, St. Paul and Minneapolis, were the men above the normal average.

Anthropologist's Accurate Figures

So far as women and children are concerned, all scientific measurements that have been made were for health purposes, or else to compare the racial types that blend in the American melting pot. The anthropologist who is studying the racial differences is seeking the measurements that distinguish these racial types. The figures which give him this information have been standardized.

His methods of working, his use of instruments, are all scientifically precise. He knows that by following the accepted procedure, he can compare his measurements with those taken by fellow scientists on other human beings in any part of the world. He spends much time



All 38's, But Look at the Difference

They show why millions of dollars are spent altering ready-to-wear clothes. The differences in height, neck measure, slant and width of shoulders, waist and hip measure, position of waistline, and other proportions would make changes necessary on almost any size 38 pattern or ready-made garment if it is to fit these figures properly.

over head proportions. When he measures the arm, he runs his line from tip to tip of the middle fingers. He considers the waist too indefinite and shifting a landmark to be of any scientific value for his purpose. So he guides from the hip bone instead.

Some of these measurements, which anthropometrists have been carefully gathering, would be useful to the clothing-maker; but additional figures would be needed, Miss O'Brien said. Anyone who has made clothing at home or who has worked in the industry knows that clothing has its customary landmarks of measurement. The clothing maker would like to know the circumference of the wrist of American types. He would like to know the circumference of waist, and the side length of a trouser leg.

Some manufacturers, Miss O'Brien has found, draft their own patterns. Others rely on model makers of the industry. In either case, the measurements have a heritage of tradition, like recipes handed down through families. From time to time they are modified, if there are complaints. Some firms probably have made minor researches, holding the results as trade secrets. But, Miss O'Brien adds, most manufacturers do not realize that measurement is a science rather than an art, and so it is unlikely that such secrets are of basic value.

"On the contrary, there are many indications that ancient ideas of human proportions are still being relied upon," she has found.

Study Ancient Theories

For evidence that the clothing industry still turns to the measurements treasured by ancient and medieval art it is only necessary to read through the files of some of the clothing trade journals. Theories of Leonardo da Vinci, Michelangelo, and nameless artists of Egypt and Greece are explained and discussed.

The art canons set up by the old masters grew out of the belief that human proportions are based on

secret harmonies. It was thought that the head or the foot or some other part of the body must be the significant unit from which a formula for perfect bodily proportion could be worked out. Some figured eight head lengths to a perfect body, some preferred seven. Seven heads as a standard for height was particularly endorsed by writers who linked

would their tape lines and guides be the precise tools of the anthropometrist.

Another suggestion is that colleges might measure different American types that are at hand in their neighborhoods. Iowa, for example, might measure the farm girl, other colleges would measure children, men typical of an inland city, stenographers, or laborers.

Besides the lack of accurate measurements, fitting difficulties are increased by skimp-cutting of garments. This super-economical use of goods enables a manufacturer to sell popular styles more cheaply.

Skimp-cutting is particularly noticeable in children's clothes. How many of your friends, Miss O'Brien asks, tell you that Junior is large for his age, and offer as proof the fact that he wears a suit two years larger than his years would call for? His bewildered parents do not realize that the point is Junior's suits are cut small, and not that Junior is such a big boy. It is not unusual, she has found, to

encounter a child of five wearing a seven year old suit of underwear and a four year old outer suit.

"Expansion" Clothes

Children have a hard time with the fitting of clothes, at best. Their clothes are likely to be bought large and worn until they are unmistakably tight and outgrown. The Bureau of Home Economics believes that children's clothes should be designed to meet this problem of "expansion" better than they now are. A suit with an adjustable shoulder is one of the simple but worthwhile ideas of government designers.

After clothing makers find out the sizes of real Americans, the next step will be to turn out clothes to fit types. Your shoes are cut in sizes based on your combination of length and width. Coats, and other garments, now made according to bust measure, may eventually be marked tall 36, large-hipped 36, slender 36, in as many combinations as the statisticians find necessary and practical.

Science News-Letter, September 27, 1930

THE OLD AND THE NEW BEAUTY

	Old Greece <i>Venus de Medici</i>	Modern America <i>Miss Campbell</i> <i>Miss Malcolmson</i>	
Neck	12¼	12½	12½
Bust	34½	35	34
Waist	27½	25	26
Hips	36½	38	34
Thigh	21½	20	20
Calf	14	13¼	13¼
Ankle	8¼	7¼	7½
Upper arm	11½	10	10½
Lower arm	11¼	—	9
Wrist	6¼	5½	6
Height	5 ft. 1 in.	5 ft. 5¼ in.	5 ft. 6 in.
Weight	—	130 lbs.	133 lbs.

their formulas with occult revelations and mystic number harmonies.

The old Greek Pythagoras, whose researches into Oriental lore made him a person of great traditional wisdom, was said to have learned the key to all harmonious proportions in sculpture, painting, and other arts. And the search for this supposedly lost lore of the ancients has never been entirely given up.

One retail dealer who pondered over the difficulties of fitting clothes to the American public became convinced that customers in the shops should be measured as a guide to average proportions. He suggested, not long ago, that the shops have their saleswomen measure customers in the course of fittings. Then these measurements could be assembled and charted.

This plan sounds practical at first mention, but Miss O'Brien points out that it would not be the hoped-for cure of the situation. Fitters and sales clerks are not trained to take scientific measurements. Nor



DEAF-BLIND PIANIST

Helen May Martin, of Kansas. She hears no sound, but playing is her chief interest in life, and she gives concerts which are pronounced competent. She is known as the only deaf-blind person to take up a musical career. Her appreciation of music comes to her through the vibrations, and she has decided likes and dislikes, preferring the music of the masters. Beethoven and MacDowell are her favorites.

DISCOVERY of 50 more cases of people who live within the double barricade of darkness and silence now brings the record of individuals of Helen Keller's type in the United States and Canada up to 715. The rapidly growing list of the deaf-blind, who are found to be as a whole the most neglected class in the civilized world, is being made by Misses Corinne Rocheleau and Rebecca Mack, under the auspices of the Volta Bureau for the deaf.

While the 1920 census listed only 169 of the doubly handicapped individuals, it is now believed that there must be more than 2,000, including many aged whose sight and hearing have both failed.

Three Year Search

For three years, the two educators have traced down as many of the deaf-blind as they could find, in the first organized attempt to bring them to public attention, and to see what is being done, and what can practically be done to help them in their struggle to live as successful human beings. The first report of their investigation published this summer under the appealing title, "Those in the Dark Silence," has brought a steady correspondence revealing additional cases.

The educators emphasize that the achievements of carefully educated

Dwellers in Dark Silence

Neglected by Society

Sociology

Proper training may not transfer 2,000 American deaf-blind into accomplished Helen Kellers and Helen May Martins, but it will enable many to earn their livelihood and it will help all to enjoy life more.

deaf-blind persons, here and there, serve to show by contrast the greater misfortune of the rank and file of the deaf-blind, who get what little training they have haphazard. Helen Keller has become world famous by her conquest of life and has encouraged the handicapped everywhere to make the best of their assets. Helen May Martin, also deaf and blind, has become a competent concert pianist whose absorbing interest in life is her music, though she hears none of it.

Lack of Schools

But such achievements are not within the range of possibility for the average deaf-blind person with average, or sub-average, opportunities. Their friends and relatives realize that the senses of touch, vibration, taste, and smell are the deaf-blind person's links with the outer world. But often they do not know where to turn to get advice about developing the use of those senses, or how to find proper methods of teaching.

Schools for the blind generally refuse the deaf-blind as pupils because of their deafness, and schools for the deaf consider them too much of a problem because of their blindness. As a consequence, the report stated that today there are deaf-blind children who should be in school but who are instead mistakenly placed in asylums for the feeble-minded. If such children do find competent teachers or convince a school that they can "keep up" they are frequently turned loose after a few years, to be on their

own resources at home for life.

No class of students is more in need of follow-up work than these, and apparently none gets less, the educators concluded from their investigation. Yet the deaf-blind are in perpetual need of help and counsel.

National Institution Suggested

"They need to be kept abreast of what is being done in their interests, of the new books to read, of the new handicrafts put within their reach," the report added. "They need to be learning a little all the time to prevent the disintegration that comes from rust; and most of all they need to be delivered from the all-devouring dragon of loneliness."

The report advocates: "A national institution exclusively devoted to the general welfare of the blind-deaf; a sort of clearing house for help and advice to all those so handicapped."

It also recommends that a member of each state commission for the blind or some other official have the special duty of looking after the deaf-blind of the state, with the responsibility of keeping in touch with the facilities for education and training that the state affords. It is strongly urged that this state representative should visit the deaf-blind regularly. Even though a deaf-blind person is well cared for at home, there is a need for wider social contacts, particularly "understanding" contacts. The state representative should be able to offer a specialized friendship, as well as to give practical aid.

Science News-Letter, September 27, 1930

Glands and Milk

INJECTIONS of extracts of the anterior pituitary, a small gland located beneath the brain, cause a marked increase in milk production in cows and goats. This extremely practical discovery was announced to members of the Second International Congress for Sex Research in London by Dr. F. Grueter, a Swiss student of the endocrine glands.

The hormones of the anterior pituitary gland control several phases of sexual activity. Dr. Grueter's discovery added another hormone to the list of the anterior pituitary's products. He concludes that this hormone stimulates milk secretion, but is only effective when the milk gland has, under the influence of one of the sex glands, already reached a certain stage of activity. It increases, rather than initiates milk secretion. Since the effect of the hormone is most marked and prolonged in cows, it is expected that the dairy industry will certainly try to utilize it.

Besides the anterior pituitary, another endocrine gland, the thyroid, appears to have an effect on milk production. The surgical removal of this gland causes a fall in the yield and consumption of milk and a change in color.

Zoology

Science News-Letter, September 27, 1930

Sugar Cure for Poison

THE INJECTION of a large volume of sugar solution into a vein enables the patient or the experimental animal to recover from the effects of veronal poisoning, Drs. A. B. Luckhardt and Carl A. Johnson of the Hull Physiological Laboratory of the University of Chicago have discovered.

Veronal is widely used as a sleeping powder for human patients, as well as in laboratory animals, but its use is not without danger and frequently gives rise to serious poisoning. It was known for some time that veronal is excreted slowly and almost unchanged in the urine. If the excretion of the drug could be hastened, the chances of the recovery of the patient would improve.

Drs. Luckhardt and Johnson succeeded in hastening the excretion of veronal through the kidneys by injection of 5 to 10 per cent. grape-sugar solutions into the vein. The injection of about 35 grains of veronal produced a sleep lasting for 40 hours in normal dogs, but if the dogs received from 1 to 2 liters of sugar solution after the dose of veronal, the recovery time was reduced to between 14 and 18 hours.

A woman who had taken 60 grains of veronal apparently with suicidal intentions, was given one and one-half liter sugar solution three to four hours later. The injection produced marked increase in the secretion of urine; in six hours she passed 1100 cc. of urine. Five hours after the sugar injection she could easily be roused and another six hours later showed almost no symptoms from the drug.

There is little doubt that increasing the efficiency of the kidneys by injections of large volumes of fluids will continue to save life in accidental and intentional veronal poisonings.

Medicine

Science News-Letter, September 27, 1930

Caves Hide Secrets

CAVES of eastern Texas, inhabited by an ancient people, may help science to explain how the mysterious Mound Builder culture found its way to the Mississippi Valley where it flourished in prehistoric times.

Matthew W. Stirling, chief of the Bureau of American Ethnology, has just returned from exploring this western region which is still practically untouched by archaeologists. He reported finding caves bearing traces of human occupation and apparently well worth investigation by Smithsonian Institution expeditions.

The Indians who built fires in the cave shelters, and left their broken tools and dinner bones there to be buried in dust and debris were probably similar to the Basket Makers of the early Southwest, Mr. Stirling's trial digging revealed.

Greatest interest in these caves hinges on the fact that they are along the route where the Mound Builder culture presumably advanced if it spread overland from Mexico to the Mississippi Valley. Here may be preserved some evidences of those ancient happenings.

One question to be answered, Mr. Stirling explained, is whether there was an actual migration of Aztecs or some other tribe from the south, or whether the Mexican Indians merely passed along by trade contacts their ideas of building high places, and art designs, and other knowledge and customs that they shared with the Mississippi Valley Mound Builders.

Mr. Stirling also selected sites in northeastern Nevada which seem promising for excavation.

Archæology

Science News-Letter, September 27, 1930

IN VARIOUS S

Profit From Loss

THE heating effect of electrical rotating machinery is no longer entirely a loss. Temperature increases caused by resistance, eddy currents, and magnetic effects in direct current and synchronous motors and generators are now being scientifically used to warm the buildings which house the equipment.

In recent installations sheet metal hoods of a new design collect the air warmed by the revolving machinery and transfer it to ducts which carry it where it can be used most effectively for heating. In the summer it is exhausted in the open to keep the buildings cool.

Made to take advantage of the ventilation characteristics of the machinery, the new hoods also greatly reduce windage losses. Cool air enters near the ends of the armature shaft and is discharged along its circumference.

Although the machines under the hoods act as fans and pump their air, they operate more efficiently than they would in the open or enclosed the old way.

Invention

Science News-Letter, September 27, 1930

Roman Graves Unearthed

ABURIAL ground of working classes of the ancient Roman world has been discovered on the Sacred Island near Ostia, seaport of Rome. Twenty tombs have already been unearthed under the direction of Prof. Guido Calza, of the University of Rome, and thirty more may be restored to view.

The most humble Roman citizens as well as the more prosperous buried here received some tribute of art appropriate to his calling. A sailor's brick-walled tomb is marked with a bas relief of a boat rowed over the waves. A miller's tomb is decorated with a horse harnessed to a wheat grinder. A doctor's tomb has a carving of his first aid kit and also a bas relief of a surgical operation.

The finding of the burials may set at rest scholarly speculation as to why the place was referred to as the Sacred Island in old writings.

Archæology

Science News-Letter, September 27, 1930

SCIENCE FIELDS

Ferns Give Clue

THE FERNS of the Hawaiian Islands, by not behaving as they might be expected to, are furnishing data toward the eventual solution of the tangled puzzle of the archipelago's geological history. This is the opinion of Dr. E. D. W. Brown, a woman botanist who has done much work in Hawaii.

"We are now beginning to compare the migration of spore-bearing plants in the Pacific area with that of the seed plants," she said recently. "It seems that we should expect little or no endemism in the ferns, since the dust-like fineness of the spores would seem to adapt them particularly well for wide distribution by hurricanes and violent winds or even by slow-moving air currents; and it is a matter of considerable surprise to find how many species of ferns and fern allies are confined to local areas.

"Instead of being distributed in the paths of the trade winds, seemingly their migration has been nearly as dependent upon the emergence and submergence of the islands of the ocean and the attendant factors favoring plant dispersal, as that of the seed plants."

Botany

Science News-Letter, September 27, 1930

New Pyramid in Mexico

AN immense pre-Spanish pyramid, A not yet on the Mexican map of known archaeological sites, has been discovered buried under the tropical growth of a Vera Cruz forest about 50 miles south of Tampico and several hours' horseback from the branch line railroad station of Ozo-luama.

A federal congressman from Vera Cruz who saw the ruins, sent a report of the discovery with photographs to the Minister of Public Education. Although no description of the ruins is included, the photographs show a fairly well-preserved pyramidal structure. It is faced with even blocks of dressed stone. Idols of stone found scattered at the base of the pyramid in the bush are primitively carved.

Eduardo Noguera of the Department of Archaeology has gone to Ozo-luama to inspect the site.

The site is on the borderland between the Huastec and Totonac Indian country. The Huastecs are a race of whom very little is known. They are primitive in culture, and a mystery to anthropologists because they are a human island in a foreign sea. They speak a Mayan tongue, although they are separated by great distances and by many other racial groups of the Mayas of Southern Mexico and Yucatan, and they never approached the cultural heights of the Mayas.

The Totonacs occupied the coastal region of central and northern Yucatan at the time of the Spanish Conquest. They were mild and unwarlike, and at least artistically affiliated with the southern Mayas, as their art and archaeological remains show.

Archaeology

Science News-Letter, September 27, 1930

Corinth's Old Trade

POTTERY unearthed in this season's excavations at Corinth testifies to the truth of old accounts of the city's international trade relations 2,600 years ago.

About seven hundred years before Christ, Corinth built up extensive trade with Asia Minor across the Aegean Sea. Historians, setting down details, tell of gifts between Periander, tyrant of the Greek city, and the kings of Lydia, the capital of Sardis.

Now, Prof. T. Leslie Shear, of Princeton, directing an expedition to Corinth for the American School of Classical Studies at Athens, has unearthed for the first time a piece of Lydian pottery from Corinthian soil. The little pot is of the characteristic style made in Lydia and is of Lydian clay, he reported. Many pieces of pottery decorated in oriental style were also found, showing some of the ways in which eastern contacts brought new ideas into Corinthian art.

Excavation of 348 graves, representing Corinthian development from 2000 B. C. to Roman times, provided the expedition with hand-made pottery, ornaments of bronze and gold, weapons, toys of Roman children, and other articles once thought appropriate to accompany the dead.

Graves of the Roman period show that, when the Roman colonists resettled Corinth by order of Julius Caesar, they took over an old Greek cemetery. To make room for Roman burials, the bones of the Greeks were pushed aside and Greek offerings to the dead removed.

Archaeology

Science News-Letter, September 27, 1930

Ancient American Pompeii

EVIDENCE of an Indian Pompeii, buried under a fall of black volcanic ash by the last eruption of Sunset Crater, more than twelve hundred years ago, has been discovered near Flagstaff, Ariz., by an expedition from the Museum of Northern Arizona.

"We tentatively date the eruption between 500 and 700 A. D.," Dr. Harold S. Colton, leader of the expedition has just announced to Science Service.

Searching within five miles of Sunset Crater, the expedition uncovered prehistoric sites representing three stages of Indian life in the Southwest. These are late Basket Maker Indians, and the first and second stages of Pueblo culture, which succeeded the Basket Making age. Over the sites inhabited by the two older groups is the sinister black blanket. Not one of the thirteen pit houses of the second Pueblo period shows any trace of the menacing ash.

"Much good charcoal has been recovered, so the sites may later be dated accurately by the tree ring method of Dr. A. E. Douglass, of the University of Arizona," Dr. Colton said.

Archaeology

Science News-Letter, September 27, 1930

Pitchers' Elbow

THE CAUSE of a condition known as baseball pitchers' elbow has just been reported to the American Medical Association by Dr. J. F. Kirby of Baltimore. Dr. Kirby described a number of cases, in which the injury occurred while the patient was pitching in a game. Intense pain, swelling and inability to use the affected arm freely were the symptoms.

The cause was found to be a small piece of cartilage and bone which was broken off the head of the bone on the thumb side of the forearm. Handling it, or moving the arm in certain directions caused pain. When the bone was removed, there was no pain and the patient was able to use his arm again.

The bit of bone is chipped off in the last swift, sudden move of the arm in pitching the ball, it was thought.

Medicine

Science News-Letter, September 27, 1930



The First Stethoscope

A TREATISE ON THE DISEASES OF THE CHEST, in which they are described according to their Anatomical Characters, and their Diagnosis established on a new principle by means of Acoustick Instruments. Translated from the French of R. T. H. Laennec, M. D., with a preface and notes by John Forbes, M. D., Philadelphia, 1823.

However dangerous diseases of the chest may be, they are, nevertheless, more frequently curable than any other severe internal affection. For this reason medical men, in all ages, have been desirous of obtaining a correct diagnosis of them. Hitherto, however, their efforts have been attended by little success,—a circumstance which must necessarily result from their having confined their attention to the observation and study of the deranged functions only. From the continued operation of the same cause, we must even now confess, with Baglivi, that the diagnosis of the diseases of this cavity is more obscure than that of those of any other internal organ. . . . Nay, I will go so far as to assert, and without fear of contradiction from those who have been long accustomed to morbid dissections,—that before the discovery of Avenbrugger, one half of the acute cases of peripneumony and pleurisy, and almost all the chronic pleurisies, were mistaken by practitioners; and that, in such instances as the superior tact of a physician enabled him to suspect the true nature of the disease, his conviction was

Laennec's stethoscope was the first instrument ever placed in the hands of a physician to help him diagnose disease in the chest cavity. His account of it was written in 1819. Our Classic is from the first translation of that book into English. Forbes took many liberties with the original arrangement in making his translation, and apologized for a few of them. "As it is, however," he added, "I still think the present arrangement very superior to the original."

rarely sufficiently strong to prompt and justify the application of very powerful remedies. The percussion of the chest, according to the method of Avenbrugger, is one of the most valuable discoveries ever made in medicine. By means of it, several diseases, which had hitherto been cognisable by general and equivocal signs only, are brought within the immediate sphere of our perceptions, and their diagnosis, consequently, rendered both easy and certain.

Where It Fails

We must still admit, however, that the method of percussion is far from being complete, or generally available. It frequently affords no indication in phthisis; and in no case does it enable us to distinguish this disease from chronic peripneumony. Even in peripneumony it fails us in a great measure when the inflammation is confined to the centre of the lung, or when both lungs are equally affected, and only in a slight degree. It does not enable us to distinguish the disease just mentioned from pleurisy, hydro-thorax, or any other effusion into the cavity of the chest. It completely fails us, or rather certainly misleads us, in the disease called *Pneumo-Thorax*. It gives no indication of the diseases of the heart until this organ is greatly enlarged; and it is often before this takes place that the disease proves fatal. It affords no assistance in aneurisms of the aorta and large vessels, until the nature of the disease is appreciable by the sight, or by the touch. In many other respects, also, the indications afforded by percussion are rendered

The Stethoscope

—A Classic of Science

Medicine

The translation was inspired by genuine interest for the new method, which Forbes hoped to see widely used, though he felt that it was "opposed to all our habits and associations." "It must be confessed," he said, "that there is something even ludicrous in the picture of a grave physician formally listening through a long tube applied to the patient's thorax, as if the disease within were a living being that could communicate its condition to the sense without."

equivocal by peculiarities of formation, by the niceties required in its performance, and by the circumstances under which it is performed. It is more particularly in diseases of the heart that we regret the insufficiency of this method, and wish for something more precise. The general symptoms of disease in this organ greatly resemble those produced by many nervous complaints, and by the diseases of other organs. The results afforded by the application of the hand to the part, with the view of judging from the tactual sensations communicated, have been found of some use, in doubtful cases; but, as a general method, this is by far too vague and uncertain to be of much benefit.

In these cases some physicians have attempted to gain further information by the application of the ear to the precordial region; and, doubtless, such a proceeding will increase the certainty of the diagnosis. Even this, however, is very insufficient; and there are, besides, many reasons why it cannot be followed, as a general guide, in practice. Nevertheless, I had been in the habit of using this method for a long time, in obscure cases, and where it was practicable; and it was the employment of it which led me to the discovery of one much better.

The Invention

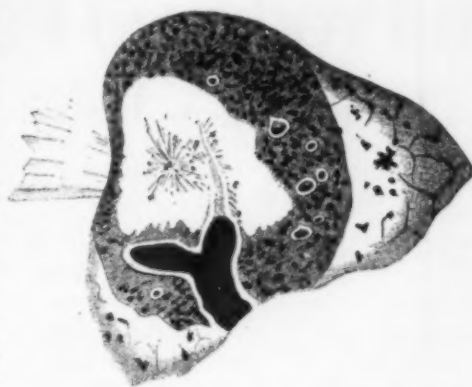
In 1816, I was consulted by a young woman labouring under general symptoms of diseased heart, and in whose case percussion and the application of the hand were of little avail on account of the degree of fat-

ness. The other method just mentioned being rendered inadmissible by the age and sex of the patient, I happened to recollect a simple and well-known fact in acoustics, and fancied, at the same time, that it might be turned to some use on the present occasion. The fact I allude to is the augmented impression of sound when conveyed through certain solid bodies,—as when we hear the scratch of a pin at one end of a piece of wood, on applying our ear to the other. Immediately, on this suggestion, I rolled a quire of paper into a sort of cylinder and applied one end of it to the region of the heart and the other to my ear, and was not a little surprised and pleased, to find that I could thereby perceive the action of the heart in a manner much more clear and distinct than I had ever been able to do by the immediate application of the ear. From this moment I imagined that the circumstance might furnish means for enabling us to ascertain the character, not only of the action of the heart, but of every species of sound produced by the motion of all the thoracic viscera. With this conviction, I forthwith commenced at the Hospital Necker a series of observations, which has been continued to the present time. The result has been, that I have been enabled to discover a set of new signs of diseases of the chest for the most part certain, simple, and prominent, and calculated, perhaps, to render the diagnosis of the diseases of the lungs, heart and pleura, as decided and circumstantial, as the indications furnished to the surgeon by the introduction of the finger or sound, in the complaints wherein these are used.

In prosecuting my enquiries I made trial of instruments of various composition and construction. The general result has been that bodies of a moderate density, such as paper, wood, or Indian cane, are best suited for the conveyance of the sound, and consequently for my purpose. This result is perhaps contrary to a law of physics;—it has, nevertheless, appeared to me one which is invariable.

The Stethoscope

I shall now describe the instrument which I use at present, and which has appeared to me preferable to all others. It consists simply of a cylinder of wood, perforated in its centre longitudinally, by a bore three lines in diameter, and formed so as to come apart in the middle, for the benefit of being more easily carried. One extremity of the cylinder is hol-



Upper lobe of a tuberculous lung, from the Forbes translation of Laennec's Treatise.

lowed out into the form of a funnel to the depth of an inch and half, which cavity can be obliterated at pleasure by a piece of wood so constructed as to fit it exactly, with the exception of the central bore which is continued through it, so as to render the instrument in all cases, a pervious tube. The complete instrument,—that is, with the funnel-shaped plug infixed,—is used in exploring the signs obtained through the medium of the voice and the action of the heart; the other modification, or

CHEST TAPPING DIAGNOSIS

Discovered by a Brewer's Boy

This method, recommended by Avenbrugger, under the name of percussion, consists in striking the chest with the ends of the fingers united; in which case, if the lungs are sound, full of air, and if no foreign body, either solid or fluid, occupy the interior of the thoracic cavity, the sound produced by the percussion has been compared (an exaggerated comparison) to that proceeding from an empty barrel when struck. Where, on the contrary, a solid or fluid body fills one of the cavities of the thorax, or both, the parietes give, to the extent so occupied, a sound which has been characterized by the term (*mat*) dull, and which is said to resemble that excited by striking the thigh in the same manner, or with the flat of the hand. The sound produced by percussion in some diseases of the heart, is but little less than in a natural state, and is then the index of a less decidedly morbid state of the viscera within. The knowledge of the degree of sound which denotes the perfect healthy state of all the organs of the chest can only be acquired by practice; and it is that alone also which enables one, in some sort, to judge of the solidity of the body which prevents the chest from sounding at all; but in forming a judgment, every allowance must be made for the natural thickness of the integuments, and for the very frequent anasarctous state of those parts, which have, in many cases, led to the belief that the chest sounded badly, when it was entirely owing to these circumstances.—

Corvisart, 1808, translated by Forbes.

with the stopper removed, is for examining the sounds communicated by respiration. This instrument I commonly designate simply the *Cylinder*, sometimes the *Stethoscope*.

In speaking of the different modes of exploration I shall notice the particular positions of the patient, and also of the physician, most favourable to correct observation. At present I shall only observe that, on all occasions, the cylinder should be held in the manner of a pen, and that the hand of the observer should be placed very close to the body of the patient to insure the correct application of the instrument.

Using the Instrument

The end of the instrument which is applied to the patient,—that, namely, which contains the stopper or plug,—ought to be slightly concave to insure its greater stability in application; and when there is much emaciation, it is sometimes necessary to insert between the ribs a piece of lint or cotton, or a leaf of paper on which the instrument is to be placed, as, otherwise, the results might be affected by the imperfect application of the cylinder. The same precaution is necessary in the examination of the circulation in cases where the sternum, at its lower extremity, is drawn backwards, as frequently happens with shoemakers, and some other artisans.

Some of the indications afforded by the stethoscope, or *mediate auscultation*, are very easily acquired, so that it is sufficient to have heard them once to recognize them ever after: such are those which denote ulcers in the lungs, hypertrophia of the heart when existing in a great degree, fistulous communication between the bronchia and cavity of the pleura, etc. There are others, however, which require much study and practice for their effectual acquisition.

The employment of this new method must not make us forget that of Avenbrugger; on the contrary, the latter acquires quite a fresh degree of value through the simultaneous employment of the former, and becomes applicable in many cases, wherein its solitary employment is either useless or hurtful. It is by this combination of the two methods that we obtain certain indications of emphysema of the lungs, pneumothorax, and of (Turn to page 205)

Meteor Swarm Produced Famous Crater

Astronomy

Formed With Force of 400 Million Tons T. N. T. Says Theory

THREE HUNDRED thousand tons of meteors, in a close swarm, exploding as they hit the earth and producing effects as violent as 400 million tons of T. N. T., could have produced the famous meteor crater, nearly a mile in diameter, near Winslow, Arizona.

At the meeting of the American Astronomical Society at Chicago, Dr. Forest R. Moulton, former professor at the University of Chicago and now a public utilities official, told of his conclusions, which leave little hope that there may be any of the original meteors left.

It has been thought that a much larger meteoric mass, perhaps ten million tons or more, would have been required to produce the effect, and that this great mass, possibly containing many rare elements, was near the crater, just below the surface, where it could be mined. Large sums of money have been spent in efforts to locate the mass, but so far they have not been successful.

Dr. Moulton, who is one of the country's leading astronomers, presented the following argument. A small meteor, perhaps weighing a pound or so, would enter the earth's atmosphere at its initial speed of around 10 miles a second. At first it would be retarded very little, but as the atmospheric resistance increased to the point where it was greater than the gravitational attraction, then the meteor would slow up. Most of the energy is radiated away as light and heat, and the meteor burns up, producing an ordinary shooting star.

2,400,000 H. P. Per Square Inch

But a meteor of large mass, say a thousand tons, encounters very little resistance as it passes through the atmosphere, and when it hits the earth, it encounters a very high resistance. For a thousand ton meteor hitting rock, Dr. Moulton calculates that the resistance is 50,000 tons per square inch and that it does work at the rate of 2,400,000 horsepower for each square inch. Even nickel iron is scarcely more resistant to these enormous forces than tissue paper, and so the meteor would be completely broken up and destroyed with explosive violence.

He also called into question the theory that many meteors come into our solar system from outer space. This has been suggested because some of the meteors have been thought to move at speeds which would carry them in the curve called a hyperbola. Meteors originating in the solar system would move in a parabola and it has been thought that many might come from the region of other stars where they might have originated in the same way that the home-made product was made. Dr. Moulton, however, expressed doubt that meteors, except in very rare cases, are moving along hyperbolas, and that therefore most of the shooting stars we see in the night sky, and the occasional meteorites that land on the earth, are members of the solar system, like the sun and earth.

Ultraviolet Light and Sunspots

An astronomical mystery as to why ultraviolet light from the sun failed to vary with the number of sun spots during the year from June, 1928, to June, 1929, was put before the members of the Society.

Dr. Edison Pettit, Mt. Wilson Observatory astronomer, told of his researches on the variation of the sun's ultraviolet radiation since May, 1924. When three month averages of the number of sun spots are plotted against the intensity of the ultraviolet light during the past six years, they are found to agree very closely, except during the year mentioned, when the curves run counter. Dr. Pettit believes that there was nothing wrong with his instruments to produce this affect.

He has also found, he announced, that in June, 1924, the ultraviolet radiation was less than during any month since then. Taking the average for that month as the unit, he finds that the highest intensity was during the month of November, 1925, when it was 1.57. In February and April, 1927, it was 1.51 and last January 1.52. The lowest monthly averages have been January, 1928, with 1.18; September, 1928, with 1.12; June and November, 1929, with 1.19 and April, 1930, with 1.15. The ultraviolet rays from the sun are the ones that produce sunburn, are mainly

concerned in taking photographs, and produce certain other bodily effects, such as the prevention of the disease rickets.

Uses Quartz Lenses

Dr. Pettit's method is to observe the sun through lenses of quartz, as glass is opaque to the ultraviolet rays. He uses two lenses, one covered with a thin film of silver, the other with a similar film of gold. The former is transparent to the ultraviolet, while the latter is opaque, but transmits visible light of a green color. By means of a vacuum thermocouple, which converts radiant energy into an electric current, he measures the intensity of the sun image as made by each lens. The green light remains relatively constant, so the difference is due to the change in ultraviolet.

Though he has used the same lenses and films of silver and gold ever since he began the measurements he finds that their constant exposure to sunlight has not made them more or less transparent.

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Europe's Muskrats

EUROPE has muskrats. American muskrats; for the animal is native to the New World. And like the old woman who lived in a shoe, Europe doesn't know just what to do with them.

Muskrats were imported to be "farmed" for their fur, when the furs from Siberia, China, Canada and other northern lands began to become scarcer. Like all rodents, they multiply enormously.

But in the more thickly populated countries, especially in western Europe, they are beginning to be looked upon as nuisances and treated accordingly. Germany and Switzerland prescribe the animals and encourage their extermination. In France, the animal is both desired and feared; desired for its fur and feared because of the possible mischief its burrowing habits may do to the embankments enclosing fish-ponds and protecting lowlands from flooded rivers.

But farther east, where there is more room and also more small bodies of water, the muskrat is hospitably received and encouraged.

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Fishing Increases on Canada Prairies

Economics

THE Canadian prairies raise other crops than those of grain. Recent Canadian government statistics show that more than \$4,000,000 was paid last year for fish caught on the prairies.

This new industry has arisen in the three central provinces of Canada, which because of their wheat growing facility have been called the granary of the British Empire. Commercial fishing is an established industry, reaching north as far as Lake Athabasca. On the shore of this lake, nearly 1,000 miles distant from Winnipeg and some 1,700 miles from Chicago, are factories where whitefish and trout are caught in large numbers to be frozen, packed in special wrappers, boxed and shipped by refrigerator barges down the Athabasca River to Waterways, the end of steel, 200 miles distant to the south.

There are innumerable lakes in the prairie provinces. Each year during the past few years has seen more and more boats of all sorts going northward to the unfished lakes of the region. Fishermen are stationed at these lakes far from the railways, and are out daily during the summer season, pulling in their nets, and bringing their catch to their station, where a boat comes every day from the central station of the fishery company to call for the load. By easy stages the fish is brought to the railways, carried that far by water craft.

Big Winter Season

In the winter the fishing still goes on. A large portion of the annual fishing sales consists of winter caught fish. Through holes in the ice the fishermen work their nets, and daily they go out to haul in the fish which have thus been captured under the thick ice. Horse drawn sleighs call once a month during the winter months, making their way over the ice, from lake to lake. The sleighs are loaded with boxes of frozen fish, which are dressed on the ice, and packed in weather that is usually thirty below zero and often down to fifty below. By sleigh the fish are taken to the railway.

Commercial fisheries are of the opinion that the fish business of the Canadian prairies is still in its infancy. They see a great future for the business with the coming of better transportation facilities. Rail-

ways are now being built farther north in the prairie provinces, and they will tap the fish districts, aiding a growing industry which brings whitefish, tullibee, pickerel, grayling, trout and sturgeon to the tables of the prairies and the mid-western states of the United States.

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Stethoscope (Continued)

the existence of liquid extravasations in the cavity of the pleura. The same remark may be extended to some other means, of more partial application, such, for example, as the *Hippocratic succussion*, the *mensuration* of the thorax and *immediate auscultation*; all of which methods, often useless in themselves, become of great value when combined with the results procured through the medium of the stethoscope.

In conclusion, I would beg to observe, that it is only in an hospital that we can acquire completely and certainly, the practice and habit of this new art of observation; inasmuch as it is necessary to have occasionally verified, by means of examination after death, the diagnostics established by means of the cylinder, in order that we may acquire confidence in the instrument and in our own observation, and that we may be convinced, by ocular demonstration, of the correctness of the indications obtained. It will be sufficient, however, to study any one disease in two or three subjects, to enable us to recognize it with certainty; and the diseases of the lungs and heart are so common, that a very brief attendance on an hospital will put it in the power of any one to obtain all the knowledge necessary for his guidance in this important class of affections.

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Old Forest Protection

THE "modern" doctrine of the conservation of natural resources is no new thing under the sun in Switzerland. Ever since the middle ages the various cantons of this mountain republic have been taking care of forests, and of the birds and beasts that harbor therein.

In 1335 the Council of Zürich issued a law for the protection of birds, establishing fines for delinquents. In 1339 the legislative assembly of Schwyz regulated the exploiting of their forests and in 1424

caused all the oak forests or groves in the canton to be protected, fining all transgressors.

In 1511 Unterwalden issued several laws regarding the protection of their woodlands and also protected their game. In 1515 the cantonal conifer forests were placed under special protection.

In 1569 the legislative assembly of Glarus protected the forests in certain districts, and in 1612 an assembly of the league of the Grisons held at Davos issued laws to protect game in the Engadine, notably chamoix and ibex.

Efforts to protect forests and bird life have never ceased in Switzerland, so that the creation of the Swiss National Park in the southeastern corner of the Lower Engadine, was merely the natural and logical development of an idea as old as the nation itself.

This park has an area of about 58 square miles, and consists of several deep valleys, walled in by precipitous mountains that reach altitudes of about 9,000 feet. The natural boundaries are of such a character that wild life in the park is practically debarred from migrating.

Forestry

Science News-Letter, September 27, 1930



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New Measures May Reveal Bigger Stars

Astronomy

AFTER eight years of preparation, the fifty-foot interferometer at the Mt. Wilson Observatory in California has been completed. Francis G. Pease, who used the smaller one, twenty feet in length, designed the new instrument and supervised its construction. The smaller one was attached to the 100-inch reflecting telescope at the observatory, and with it the first star diameters were measured, using a principle worked out originally by Prof. A. A. Michelson, University of Chicago physicist.

Antares, the bright red star in Scorpio, the scorpion, was found to have a diameter of 390,000,000 miles, and is the largest yet measured. The new instrument can be used for a number of stars beyond the reach of the old instrument, and it is possible that even larger stars may now be found.

Mr. Pease is shown in our cover illustration as he was recently mak-

ing final adjustments to the instrument. To his right appears one of the flat mirrors, set at an angle of 45 degrees, which slides along the track. A similar mirror slides along another track that was beside the photographer. These mirrors reflect the light from the star to two other mirrors in the center, thence it is reflected to a 36-inch concave mirror below, which brings the light to a focus.

Under proper conditions, when looking through the eyepiece, the image shows a series of light and dark bands, called "interference fringes." If the star is sufficiently large, these can be made to disappear by moving the outer mirrors, and from their distance when this happens the star's diameter can be computed. All the motions of the instrument are done by electric motors, controlled from the switchboard seen below the flat mirror.

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Chemical Meeting—Continued

associated with the production of these bald spots." In some cases, he explained, the patient becomes completely bald, not only on the head, but on all parts of the body.

Dr. Myers announced that they had found the cause to be a retention in the body of arsenic and lead. These metals get into the body, he declared as a result of their use as sprays for fruit and vegetables, from drinking or using water that is supplied through lead pipes, or from the exhaust of automobiles using gasoline containing lead compounds as an anti-knock. Dr. Thomas Midgley, chemist with the General Motors Corp., however, questioned this latter statement, and said that the only hazard in connection with the use of tetraethyl lead in ethyl gas is among the men who manufacture it, and that its use does not appreciably increase the amount of lead in the city air.

Improving on Castor Oil

Dr. E. Emmet Reid, of Johns Hopkins University, told of a study that he and Dr. Warren M. Cox, Jr., have made of the Japanese "castor oil fish." This fish, zoologi-

cally known as *Ruvettus pretiosus*, is caught at a depth of a half mile. Drinking an oil extracted from it, or even eating its flesh or chewing on its bones, produces a physiological effect similar to, but even more prompt than, that produced by castor oil. The analysis has shown it to consist of fatty acids, chiefly oleic acid, and higher alcohols.

Helping Conquer Tuberculosis

Another paper presented before the medicinal chemists was seen as a further step toward the eventual conquest of tuberculosis. Dr. R. J. Anderson, of Yale University, told of the work of himself and Dr. E. Gilman Roberts in analyzing the tuberculosis bacillus chemically. Several years ago they found that a compound could be extracted from the dead "bugs" that could produce all the symptoms of tuberculosis when injected into the body, and that this contained a very peculiar sugar, the first poisonous sugar to be discovered. Now they have found another new carbohydrate, which they call maninositose. It is what is called a polysaccharide and is said to be the first compound of this

kind ever to be found in nature.

"Its discovery will open a new chapter in the study of cell metabolism," Dr. Anderson declared.

Science News-Letter, September 27, 1930

Photo on Copper

PRINTING a photograph on copper from a negative almost as easily as printing it on ordinary photographic paper can be accomplished by a method described in a report to *Nature* by C. J. Smithells, of the General Electric Company's British research laboratory at Wembley. It depends on the fact that cuprous chloride, or chloride of copper, is sensitive to light.

"The process affords a simple and rapid method of obtaining a sharp photographic image on the surface of plates of copper and copper alloys, including white alloys like German silver," states Mr. Smithells.

He gives the following directions:

"The copper or brass surface is polished and cleaned as for engraving, and dipped for ten seconds into a ten per cent. solution of cupric chloride or copper ammonium chloride. A very thin white film, which X-ray examination shows to be cuprous chloride, forms on the surface of the plate. The plate is washed in running water, rinsed in methylated spirit, and dried in the air. The methylated spirit not only accelerates drying, but also makes the film much more adherent, and the wet plate can be wiped with a cloth without the film being destroyed.

"The plate is now light sensitive. On exposure for a few seconds to the direct light from an arc lamp the surface turns black, owing to the conversion of cuprous chloride into cuprous oxide. For contact prints from ordinary negatives an exposure of about one minute to the light of an arc lamp is required. The image (positive) so obtained is about equal in definition and contrast to that obtained in the ordinary three-color and photogravure processes. The image can be 'fixed' by washing in dilute hypo or salt solution, but since this also reduces the intensity of the image the plate should be over-exposed during printing. For many purposes, such as engraving, fogging by diffuse daylight is so slow that fixing is unnecessary."

Photography

Science News-Letter, September 27, 1930

NATURE RAMBLINGS

By Frank Thone

*Liquidambar*

Anybody who is planning on putting in a group of shade or ornamental trees, whether in a park planting, around a country house or even on a fair-sized city place, will do well to remember the liquidambar, or sweet-gum. This splendid tree of the American southeast is at least moderately hardy, and will thrive in cultivation many hundreds of miles north and west of its natural range.

It may have to be nursed a bit while it is little, and there will always remain the danger that a too-stiff windstorm will wrench off a limb, for its wood is none too strong; but even so, it will, in many future autumns, repay a thousand times over the care it gets.

For there is scarcely a tree that can show such splendid leaves in the fall. Pointed like stars, they change from their strong summer green to a deep wine-purple that is the very blood of the sun. An autumn-colored liquidambar against a sunset sky, with the light shining through its sanguine leaves, is a sight not soon to be forgotten.

The fruits of the liquidambar tree also are worth growing to look at, though they are not good for even birds or squirrels to eat. They are such curious-looking things, bristling toward all the stars with their hundred sharp little points, like maces for the wars of fairy cavalry.

And the twigs of the tree intrigue one's interest as well, for they have caught the trick, known to a few widely scattered woody plants, of developing their cork in long, narrow streaks, so that they come to be ridged with "Wings" of bark. All round, the sweet-gum is a tree of great interest as well as great beauty.

Botany

Science News-Letter, September 27, 1930

Paralysis Spreading

WITH 490 new cases of infantile paralysis reported to the U. S. Public Health Service in one week recently, it is feared that the outbreak may reach epidemic proportions. This total is higher than it has been for several years. The increase over the preceding week was 128 cases.

No predictions can be made as to how far the outbreak will go, but state and local health officers throughout the country are very much concerned over the continued increase in the number of cases.

The situation in Kansas is especially serious, where 71 cases were reported for one week alone. Other states reporting large numbers are: Ohio, 65; New York, 60; California, 56; Illinois, 36; Massachusetts, 21; Minnesota, 28; Michigan, 10; Maine, 10; Iowa, 20; and Oklahoma, 11.

Health officers are advised to arrange for the collection and distribution of the convalescent serum which has been found helpful in treating the disease. Isolation of patients is of course necessary. Parents are advised to keep children out of

crowds and away from strangers. Because treatment is only successful in the early stages, before paralysis has set in, parents should lose no time in consulting a doctor if a child shows any suspicious symptoms.

Public Health

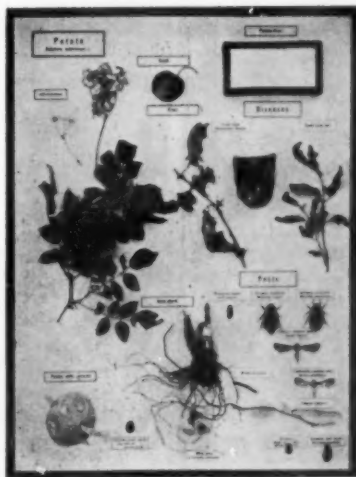
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LIFE HISTORIES OF OUR COMMON CROPS

(Including Fungus and Insect Pests)



(e) Potato

Prepared in wood exhibition cases with glass tops, including not only the features of the plant itself, but also specimens of the most injurious fungus and insect pests, and samples of the most important manufactured products derived. For instance, the Potato preparation contains the following specimens:—

The plant, flower stalks, fruit, germinating potato tuber, potato alcohol, potato flour, potato leaf roll, tuber infected with late blight (*P. infestans*), plant infected with Bacterial Blight (*B. solanacearum*), Aphid (*A. solani*), June Bugs (*Melolontha vulgaris*, *M. hippocastani*, and *Rhizotrogus solstitialis*), June Bug larva, Leaf Beetle (*Adimonia*), Mole Cricket (*Gryllotalpa*), Root Borer (*Lacon*), Satin Moth and pupa (*Agrotis*), Colorado Potato Bug and larva (*Leptinotarsa*).

The following life histories are available:—

- | | |
|---------------------------------------|---|
| (a) Rye (<i>Secale cereale</i>) | (e) Potato (<i>Solanum tuberosum</i>) |
| (b) Wheat (<i>Triticum vulgare</i>) | (f) Bean (<i>Phaseolus vulgaris</i>) |
| (c) Barley (<i>Hordeum sativum</i>) | (g) Pea (<i>Pisum sativum</i>) |
| (d) Oats (<i>Avena sativa</i>) | (h) Horse Bean (<i>Vicia faba</i>) |

E1575 Common Crops Life Histories (specify letter), each \$6.50



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FIRST GLANCES AT NEW BOOKS

RATIONAL INDUCTION: AN ANALYSIS OF THE METHOD OF SCIENCE AND PHILOSOPHY—Homer H. Dubs—*Univ. of Chicago Press*, 510 p., \$4.50. This book treats from a new angle the fundamental problem for all science and philosophy. Whereas the usual discussion assumes that we know what knowledge is and proceeds to ask: What is the nature of knowledge? this treatise tries first to answer the logically prior problem: How can certainty be assured? This problem is solved in demonstrating the correctness of a new theory of induction, derived from the method of hypothesis. Thereupon the problem of knowledge becomes relatively easy of solution. A new epistemological theory is propounded, which finds reality to lie in the objects of modern science, and provides a logical and thoroughly criticizable method of connecting those objects with experience and with scientific law.

Philosophy

Science News-Letter, September 27, 1930

COLORADO RIVER DEVELOPMENT AND RELATED PROBLEMS—Edited by C. A. Dykstra—*American Academy of Political and Social Science*, 42 p., \$1. A university professor looks at Boulder Dam. In the foreword of this pamphlet, which makes up part two of Vol. CXLVIII of the annals of the Academy, he sees in this development a tremendous excursion into the realms of regional planning. Among the authors are an electrical engineer who tells how community development in the Southwest will be influenced by the Boulder Dam project, a hydraulic engineer who describes metropolitan distribution of water in the Los Angeles area and a former chief engineer of the U. S. Reclamation Bureau who presents the major engineering problems of this Colorado development.

Hydraulics

Science News-Letter, September 27, 1930

HOW THE WORLD BEGAN—Edith Heal—*Rockwell*, 112 p., \$1.25. The story is vividly told and amusingly illustrated. The book is one of the Junior Science Series, intended for children. However, the parent who reads it aloud will not be bored. A University of Chicago professor vouches for the scientific accuracy.

Prehistory

Science News-Letter, September 27, 1930

ADVENTURES IN DISH GARDENING—Patten Beard—*DeLaMare*, 204 p., \$2.50. The joy of a dish garden, which is the name for the tiny Japanese and Chinese landscapes growing in bowls, is increased when you make your own instead of buying it at the florist shop. This small book gives many practical directions for making and caring for dish gardens of both Oriental and Western spirit. The author suggests possible uses of the dish garden in schools and libraries as well as in the home. The book is well illustrated and altogether, dish gardening should become a popular indoor sport.

Horticulture

Science News-Letter, September 27, 1930

THE MEASUREMENT OF MAN—J. Arthur Harris, Clarence M. Jackson, Donald G. Paterson, Richard E. Scammon—*Univ. of Minnesota Press*, 215 p., \$2.50. Four Sigma Xi lectures on: The measurement of man in the mass; normal and abnormal human types; personality and physique; and the measurement of the body in childhood. Brought together in print, with many graphs, tables, and photographs, they make a serviceable text and an up-to-date reference book on this important branch of anthropology.

Biometrics

Science News-Letter, September 27, 1930

UNTECHNICAL EXPLANATIONS: ELECTRICITY, TELEGRAPH, TELEPHONE—John F. Skirrow—*Int. Tel. & Tel. Corp.*, 69 p., 25c. A useful little elementary account of electricity and electrical circuits, particularly as they are used in wire communication. The author is consulting engineer and vice-president of the Postal Telegraph-Cable Co., so naturally the work of his company is rather emphasized, though with no sacrifice of accuracy.

Physics

Science News-Letter, September 27, 1930

BIRDS COLLECTED BY THE CHILDS FRICK EXPEDITION TO ETHIOPIA AND KENYA COLONY. PART I: NON-PASERES—Herbert Friedmann—*Govt. Printing Office*, 516 p., \$1. A thoroughgoing monograph of one section of the bird life in a hitherto little-worked part of Africa.

Ornithology

Science News-Letter, September 27, 1930

MODERN PHYSICS—Theodor Wulf, S. J., Translated by C. J. Smith—*Dutton*, 469 p., \$10. In this book Father Wulf, who is professor of physics at Ignatius Kolleg, Valkenburg, Holland, has produced an excellent summary of modern physics in its many phases. It is divided into four main parts, viz.: "the material world," "the atomic structure of matter," "the structure of the atom" and "the physics of the ether." In the last part he discusses the development of the quantum mechanics by Heisenberg and of the wave mechanics by Schrödinger from the original work of de Broglie. Regarding these theories, he says, "at the present time neither . . . has been so far developed that it can be said that the goal has been reached. At the moment everything is, so to say, in a state of flux. Many new ideas are still embodied in the theory, but also the meanings of the new views are frequently being modified. Under these circumstances any attempt to estimate the value of the new theories must be considered premature."

Physics

Science News-Letter, September 27, 1930

THE DEVELOPMENT OF SEX IN VERTEBRATES—F. W. Rogers Brambell—*MacMillan*, 261 p., \$4. The book aims to correlate the knowledge of reproduction gained through recent anatomical, physiological and eugenical studies. Besides reviewing past work, the results of much new research, chiefly the author's, are given. A preface by Julian S. Huxley concludes that the book should be of service both to research workers and to students interested in the general biology of sex. However, the lay reader would not be interested. There are numerous illustrations and a bibliography.

Zoology

Science News-Letter, September 27, 1930

CROSS-SECTIONS OF RURAL HEALTH PROGRESS—Harry S. Mustard, *Commonwealth Fund*, 230 p., \$1.00. Rutherford county, Tennessee, was the scene of one of the Commonwealth Fund child health demonstrations for four years ending in 1928. The history of this demonstration is told in this bound report by its director.

Public Health

Science News-Letter, September 27, 1930